Reflective Energies

Contract #: 500-00-013
Contractor: Reflective Energies
Subcontractors: Endecon Engineering: Overdomain
Contract Amount: $1,501,268
Contractor Project Manager: Edan Prabhu (949) 380-4899
Commission Contract Manager: David Michel III (916) 651-9864
Status: Completed

Project Description:
The purpose of this project is to provide a program of monitoring, data collection, analysis, and reporting for selected Distributed Generation (DG) systems chosen for their diversity in relation to generation, the distribution grid, and customer impact concerns. Through this project, information will be disseminated to the Interconnection Workgroup (an industry workgroup), customers, utilities, manufacturers, government and others in the interest of simplifying future interconnections. This simplification will help reduce costs.
This project will also develop the specifications for a separately developed California certification database for DG systems that are certified for certain applications. The certification database will also streamline the interconnection process and is expected to reduce costs. In addition, this project will develop an interconnection guidebook that will help developers and utility customers to understand the requirements and processes associated with interconnection of distributed energy resources in accordance with Rule 21. Finally, this project will provide active participation in the Institute of Electrical and Electronics Engineers (IEEE) P-1547 Interconnection Standard Workgroup. The Contractor will be acting as co-author for the development of key sections of the new standard.
The goals of this project are to:

- Characterize the electrical effects of DG on the distribution system.
- Evaluate whether Revised Rule 21 has improved the process of interconnection of DG to the electrical system.
- Assess the potential for simplifying Rule 21 further to expand the types of different applications eligible for a "simplified interconnection."

This project could potentially reduce the cost on interconnection below what was experienced prior to the Revised Rule 21 by 30 percent for units less than one megawatt (MW) and by 15 percent for units equal to or greater than one MW. The project could also potentially reduce the costs associated with delays in approval and installation of interconnection by more than 20 percent for projects less than one MW.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California’s electrical system by determining the power quality and reliability impacts of DG units on the distribution system.
- Improving the energy cost/value of California’s electricity by assessing the cost-effectiveness of interconnecting DG units under the new Rule 21 guidelines.

Proposed Outcomes:

1. Specifications for an electronic interconnection application system.
2. Specifications for a DG-certified equipment database.
3. Recommendations for further refinement to Revised Rule 21.
4. Case studies of up to 12 different DG installations within California.
5. Develop a DG Interconnection Guidebook.
6. Provide technical support for the IEEE P-1547 National Interconnection Standard.

Actual Outcomes:

1. The database specifications have been completed and are being used to develop the online interconnection application system and certified equipment databases that will eventual reside on the Energy Commission's Distributed Energy Resources website.
2. Additionally, thirty-three interconnection workgroup meetings have been supported to further refine Revised Rule 21. Outreach has been initiated to California municipal, cooperative utilities and irrigation districts. Several have adopted near versions of the Revised Rule.
3. Ten distributed energy equipment models have been approved as "Rule 21 Certified" while other equipment models continue to apply.
4. The *California Interconnection Guidebook*: *A Guide to Interconnecting Customer-owned Electric Generation Equipment to the Electric Utility Distribution System Using California's electric Rule 21* has been published (publication number P500-03-083).
5. Meetings of IEEE P-1547 have been attended where the National Interconnection Standard has passed a milestone adoption. With this national standard adoption, the Rule 21 Workgroup has begun revising Rule 21 to reflect the new national standard.
6. Eleven DG units on six sites were monitored for their effects to their distribution systems, their loads, and between themselves. The finding were published in the *DG Interconnection Monitoring: the FOCUS-II Project Final Report* (publication number CEC-500-2005-009).
7. Published a study to measure the benefits of interconnections of distributed generation titled, *Making Better Connections: Cost Effectiveness Report on Interconnnection of Distributed Generation in California Under the Revised Rule 21*(publication number P-500-04-044F).

Project Status:

This project was completed in December, 2004.
Final Report Title: DG Interconnection: The FOCUS-II Project
Publication Number: CEC-500-2005-006
Publication Date: January 2005. Please right click on
PIER Web Address: www.energy.ca.gov/pier/final_project_reports/CEC-500-2005-006.html
and www.energy.ca.gov/pier/final_project_reports/CEC-500-2005-009.html